

Calomel pH Electrodes Instruction Sheet

Orion 7102BN, 7103BN, 7110BN

Calomel electrodes employ a calomel reference system designed to minimize the possibility of blockage of the reference junction when the electrode is used in samples containing species such as Tris buffer and proteins.

Required Solutions

pH Buffers: Two are recommended for precise measurement, the first near the electrode isopotential point (pH 7), and the second to bracket the expected sample pH (e.g., pH 4 or pH 10).

Internal Fill Solution: Orion 900014.

Set Up

1. Remove the protective shipping cap from the sensing element and save for storage.
2. Clean any salt deposits from the exterior by rinsing with distilled water.
3. Uncover the fill hole. Fill the electrode with internal filling solution, Orion 900014, if needed.
4. Shake the electrode (as you would a clinical thermometer) to remove any trapped air bubbles.

Measurement Hints

- A two point calibration is recommended at the beginning of each day, and at least a one point calibration every two hours.
- Temperature compensation is recommended when temperature differences of >1 °C occur between sample and calibration buffer(s).
- Stirring is recommended in all samples and buffers.

pH Calibration and Measurement

For detailed calibration and temperature compensation procedures, consult your meter instruction manual.

Two-Buffer Calibration

This procedure is recommended for precise measurements.

1. Select two buffers which bracket the expected sample pH. The first should be near the electrode isopotential point (pH 7) and the second near the expected sample (e.g., pH 4 or pH 10).
2. Rinse the electrodes first with distilled water and then with the first buffer. Place the electrode into the first buffer.
3. Wait for a stable display. Set the meter to the pH value of the buffer at its measured temperature, as described in the meter instruction manual.
4. Rinse the electrode first with distilled water and then with the second buffer. Place the electrode into the second buffer.
5. When the display is stable, set the meter to the actual pH value of the buffer as described in the meter instruction manual.

Single-Buffer Calibration

1. Set up the meter according to the meter instruction manual.
2. Rinse the electrode first with distilled water and then with the buffer being used for calibration. (The buffer should be near the expected sample pH.) Place the electrode into the buffer.
3. Wait for a stable display. Set the meter to the pH value of the buffer at its measured temperature, as described in the meter instruction manual.

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pH Measurement

1. Calibrate the electrode as described in previous sections.
2. Rinse the electrode with distilled water and then with sample.
3. Place the electrode into the sample.
4. When the display is stable, record the sample pH.

Electrode Storage

To ensure a quick response and free-flowing liquid junction, the sensing element and reference junction must not be allowed to dry out.

Short-term Storage: (between measurements/up to 1 week)

Soak the electrode in pH Electrode Storage Solution, Orion 910001. If Orion Storage Solution is not available, use 200 mL pH 7 buffer to which about 1g KCl has been added.

Long-term Storage: (more than 1 week)

Fill electrode with filling solution, Orion 900014 and cover fill hole. Cover the sensing element and reference junction with its protective cap containing a few drops of storage solution. Before returning electrode to use, prepare it as if it were a new electrode.

Electrode Maintenance and Cleaning Procedures

Weekly inspect the electrode for scratches, cracks, salt crystal build-up, or membrane junction deposits. Rinse off any salt build-up with distilled water, and remove any membrane junction deposits as directed in the cleaning procedures below.

General Cleaning: Soak in 0.1 M HCl or 0.1 M HNO₃ for half an hour. As an alternative, soak the electrode in a 1:10 dilution of household laundry bleach in a 0.1-0.5% liquid detergent solution in hot water with vigorous stirring for 15 minutes. After either cleaning is done, drain and refill the reference chamber and soak the electrode in storage solution for at least one hour.

For further assistance, contact Thermo Electron Technical Service Chemists at 1-800-225-1480.

Environmental Instruments

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